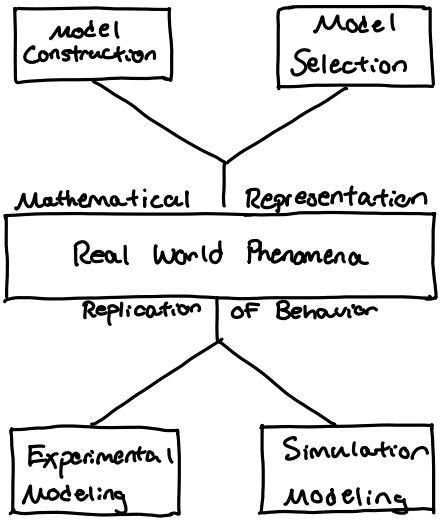
Quiz 1 Prep

- Review modeling handouts, including syllabus for Quiz 1.
- Review Ch.1, Ch.2.1, Ch.2.2

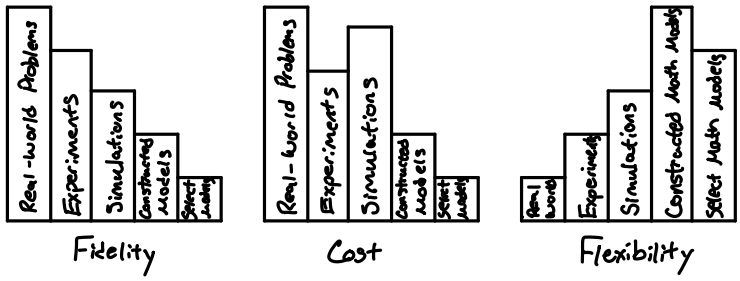
Syllabus

Basic Model Categories:



Comparison of Model Types:

> Fidelity: Preciseness of representation of reality.
> Costs: The total cost of the modeling process.
> Flexibility: The ability to change and control conditions affecting the model as required data are gathered.



Mathematical Modeling Process:

(1) - Identify the modeling process.
(2) - Make assumptions.
  (a) Identify and classify variables.
  (b) Determine interrelationships between the variables and submodels.
(3) - Solve the model.
(4) - Verify the model.
  (a) Does it address the problem?
  (b) Does it make common sense?
  (c) Test it with real world data.
(5) - Implement the model.
(6) - Maintain the model.

Report writing checklist:

- Describing
- Specifying
- Listing
- Explaining
- Showing
- Setting out
- Interpretting
- Evaluating
- Dealing with
- Qualifying
- Recommending

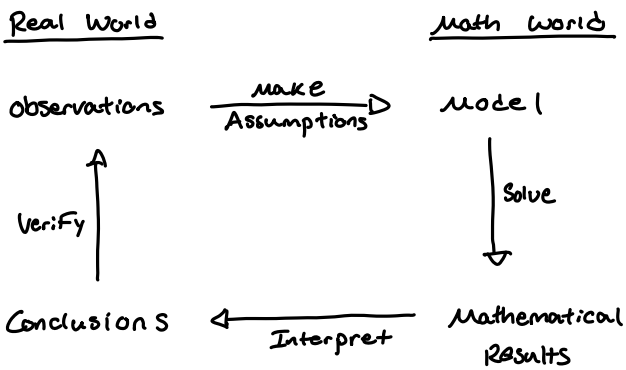
Ch.1 What is the modeling process?

Definition of Modeling:

- Mathematical modeling is the application of mathematics to real world problems.

The modeling process:

(1) - State the question to be answered.
(2) - Select the modeling approach.
(3) - Define variables and parameters
  (a) - Variables: Quantities that can change
  (b) - Parameters: Quantities that are Fixed
(4) - State the assumptions
(5) - Formulate the model
(6) - Solve the model and state the solution
(7) - Verify the model
(8) - Refine the model



Definition of a Mathematical Model:

A mathematical model is a mathematical interpretation of assumptions concerning real-world problems.

Ch. 2 Proportionality and Geometric Similarity

Definition: The variable y is said to be proportional to the variable x if there exists a nonzero constant c (called the constant of proportionality) such that

$$y = cx \qquad (2.1)$$

Graphically this looks like a strait line through the origin. We can also say that if $y \propto x$, then $x \propto y$.